

As to their appearance above ground after a heavy rain, Darwin says:

I believe that they were already sick and their deaths were merely hastened by the ground being flooded.

Mr. Schneider and Dr. Kedzie say:

The writer has often noticed, in this connection, that on a lawn which is sprinkled the earth worms are very near the surface, in fact, if the ground is nearly saturated with moisture near its surface, the worms are partially above ground. This brings us to the theory advanced by Dr. Kedzie, of the Michigan Agricultural College, who says that, although the earth worms can live under water for some time, it is distasteful and that the worm will not stay under water when it can get out. Dr. Kedzie advances the idea that the ground being well soaked with water and the air thus expelled the earth worms leave their burrows and come out to breathe, crawling upon sidewalks or other objects where they can get the pure fresh air.

We hope that the proper consideration of this subject will remove one more popular error from the domain of meteorology. The rains of frogs and of flesh and of blood belong to the same category. They may be phenomena of natural history but are not meteorological.

THIS YEAR'S CROP AND LAST YEAR'S GROWING SEASON.

It is natural to endeavor to trace the connection between the weather of any growing season and the resultant crop. Some years ago the Editor made a detailed study of the numerous conditions that effect the corn crop almost entirely outside of weather conditions. The conclusion was that the crop gathered from a field of corn depends so largely upon cultivation and skill in agriculture, it is so entirely an artificial product, that the influence of the weather as such is very largely obscured. It is only when a given yield per acre differs from the normal by 25 per cent or more that we begin to get a clear insight into the influence of the weather.

The same principles apply to other crops, such as fruits, especially apples, pears, and peaches. In the October report of the Maryland and Delaware Section attention is called to the fact the orchardists of Missouri finding that the peach crop for 1899 would be a failure, soon began to cut back the trees and that this extensive pruning has brought about a splendid growth of new branches, with a prospect of a great crop in 1900. The plan of cutting back whenever early frosts have cut off a current crop is not particularly new. It has long since been applied to the vine, and in general is based upon the consideration that the best fruit comes from the youngest branches, and that if there is to be no fruit this year, then all the growing powers of the plant should be forced to bring forth fresh branches for next years crop. A tree or a vine is a storehouse whence the fruit draws its substance. If the crop fails in any given year a double amount of nutritious matter remains stored up in the body of the plant for use next year, so that if next year's season is favorable there will be an extra good crop, but if unfavorable, the storage process continues until the favorable season comes. It would be therefore quite misleading in many cases if we should attempt to define an exact relation between the weather and the crop of any particular growing season. We must study the past history of the plant for several seasons.

PROTECTION AGAINST FROST.

It has, we believe, been abundantly shown that in order to protect any extensive area of vegetation against injury by frost we must use a sufficient quantity of heat to keep the temperature above freezing for a few hours, or even days,

while the danger is impending. It matters not whether the heat be used (1) to heat the air or the ground directly, or (2) to evaporate water and make a cloud of fog, or (3) to burn smudge and make a protecting cloud of smoke, or (4) whether the heat be utilized in the shape of work by engines spreading a layer of cloth or wooden slats over the field in order to shut in the heat of the soil and prevent its radiation to the clear sky, or (5) in the most interesting of all the physical processes—where water is used to moisten the soil and thereby passes from the condition of a compact mass of liquid into that of a thin capillary film surrounding every particle of soil over a large area, whereby a large quantity of latent heat is evolved; in all these, and doubtless other methods that might be mentioned, a certain adequate amount of heat must be utilized in order to counteract the tendency to freeze. The only question for the agriculturist is as to how he may accomplish his object most economically.

As regards the manner of making protective clouds of smoke or steam, or a mixture of both, several methods are given in Weather Bureau Bulletin No. 23, by Mr. W. H. Hammond, On Protection from Frost, but there are times when the simple direct heating of the air or the ground is also to be recommended as an economical process.

THE WEATHER AND THE DAIRY.

In a recent number of the report of the Virginia Section, Mr. E. A. Evans gave some results of his own observations on the effect of a fall in the temperature of the air, as causing a diminution in the yield of milk. He returns to this subject in the October report where he prints a further discussion from the Southern Planter. It appears that the practice of allowing cattle to stay in the fields or open pens all night during the winter months is productive of great loss to the farmers of the Southern States. * * * The food fed to the animals is first used in maintaining life and animal heat and only the surplus goes to the production of increased flesh or milk. The effect of a fall in temperature is to cut off this surplus. From records made at the Texas station during a norther, it was shown that the first effect of the cold was to increase the yield of butter, but the continued effect was to decrease both butter and milk by 20 per cent, and the cows did not recover for several days after the cold weather.

If cows are allowed to drink ice cold water, there is a fall of 6 or 8 per cent in the yield of milk as compared with those drinking warmer water.

LOSSES BY LIGHTNING.

The Iowa Monthly Review for October publishes an excellent article on losses by lightning in 1899, by Director J. Russell Sage, from which we quote the following as being of universal interest:

A notable feature of the crop season of 1899 was its unusual number of severe storms and excessive display of electric energy. This was an especial characteristic of the season from about the 1st of May to the middle of July, during which period more than three-fourths of the reported losses by lightning occurred. May was the stormiest month, the records showing that a measurable amount of rain fell at some station in the State during every day of the month. In June there was but one absolutely rainless day for the State at large, and nearly all the severe storms that occurred in these two months were accompanied by electric disturbances, resulting in more or less damage to farm property.

The aggregate loss of property covered by these 395 reports is \$52,524, of which sum \$35,194 was the total loss estimated on buildings, and \$17,330 on live stock.

These reports give details of the loss of 581 farm animals from the